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# SCIENCE :

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JOHN MICHELS, Editor.

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The attempt to utilize compressed air as a motive power for street cars in cities, appears to have been most unsuccessful. About four years since, a company was organized in New York city for the purpose of building street cars on the pneumatic system, capable of replacing those drawn by horse power, and about the early part of April, 1878, a passenger car propelled by compressed air was running on the Second avenue, New York, between 63d and 93d streets.

The experiment was considered perfectly satisfactory for a first attempt, as the cars performed their work admirably; and the public press and various eminent engineers considered the problem solved. There was, however, an essential element of success that was wanted, which appeared insignificant at the time, but which proved fatal to the whole scheme. This was a failure on the part of the engineers to design machinery which should be constant in its working, requiring little attention from the driver.

It was supposed that in building future composite pneumatic engine cars these defects could be remedied. But when the six cars built on this principle were placed on trial, the same trouble was experienced, and the experiment was abandoned, causing a considerable pecuniary loss to the promoters of the company.

The Pneumatic Tramway Engine Company, undaunted by past losses and failures, have renewed their efforts, and have recently constructed a pneumatic traction engine, which we understand will be immediately placed on trial on one of the New York elevated railroads. The successful working of Electric Railway Engines has probably increased the difficulties of those who are advocating the use of

compressed air as a motive power. In the absence of smoke, odor, noise and cinders, both the electric and compressed air systems have many advantages over steam for elevated railroads, and the question of economy will probably decide which system shall be finally accepted. At the present moment all the advantages appear to be in favor of the electric railways for use within city limits, and it is probably a mere matter of time, for all the New York elevated railroads to be running their trains by this system.

## THE STATE AND HIGHER EDUCATION.\*

BY PROFESSOR N. H. WINCHELL.

The incentive to the following address appears to have been certain remarks made officially by President John of Hamline University, who considered that "higher education should not be under the control of the State," and that the design of the State Colleges has been a conspicuous and universally acknowledged failure.

In the first part of the paper Professor Winchell presents an historical sketch of the circumstances, the result of which was "that the State finds itself in the conduct of systematic education."

After tracing the progress of education in Europe he states:

Thus we find that none of the old universities, except when under the control of the government, and sometimes not even then, have been willing to modify their curricula in compliance with the demands and spirit of the age. If they have done it, as more lately at Oxford University, it is only after the force of public sentiment has been able to batter down the walls of prejudice and conceit with which they have been surrounded. During this whole conflict throughout Europe the Church, in its various forms, but particularly the Roman church, instead of being the champion and refuge of free thought and free knowledge, has been the most powerful obstacle to its progress, and has persistently opposed every movement to introduce the means for disseminating useful knowledge among the people. The heat of the conflict is passed. The tide has set in the right direction. The old universities perceive the triumph of modern science. European governments are unanimously striving for the establishment of modern schools of science on the broadest foundations, and equipping them with the fullest appliances.

Now let us turn to America, and inquire how this history has been mirrored on our institutions of higher learning.

In the first place the church colleges that arose in this country prior to 1824, or even later, were modeled after the mediæval universities of Oxford and Cambridge, so far as they expanded into the dimensions of a university. For the most part they were simply colleges of classical lore, with but one course of study, aiming specifically, at first, to educate young men for the clerical profession. As they were born of the English universities, so they inherited their mediæval narrowness and bigotry. As the early church had grappled with Copernicus and Galileo, and had been worsted, so the later church would grapple with everything that bore a resemblance to or intimation of any new fangled notions of nature. Although the world had made wonderful strides in human knowledge, the colleges shut their eyes and ears to the change. The age demanded education in the great industries that characterize modern society, but could get only that of the age of Elizabeth. As modern science and civilization began to buzz about their doors, they drew themselves within their shells, affrighted, like snails. Having none of the elements of the

\* Delivered before the Minnesota Academy of Natural Sciences, Jan. 12, 1881.